

**Central Valley Salmonid Satellite Project Work Team:  
Juvenile Monitoring**

Final Meeting Notes from June 5, 2008  
Sacramento FWS Field Office, Sacramento, CA 10:30

Participants: Bill Poytress (Chair; USFWS), Jim Early (USFWS), Doug Threlhoff (USFWS), David Colby (USFWS), Robyn Bilski (CDWR), Kellie Whitton (USFWS), Steven Pagliughi (EBMUD), Matt Saldate (EBMUD), Clark Watry (Cramer Inc.), and Erin Chappell (CDWR).

**I. Introductions and Announcements:**

Welcome newest participants Steve Pagliughi and Matt Saldate of EBMUD.

**II. Modify /Adopt Agenda:** No formal agenda; agenda adopted.

**III. Amend /Approve prior meeting notes (1/24/08):** No comments, notes finalized and soon available at the IEP Juvenile Monitoring PWT website.  
([http://www.iep.ca.gov/central\\_valley\\_salmon/jm/notes.html](http://www.iep.ca.gov/central_valley_salmon/jm/notes.html))

**IV. Program Updates:**

**Jim Earley (USFWS):** An upper and lower rotary screw trap have sampled Clear Creek throughout the winter and spring. The trapping operation is winding down with the upper trap to be removed in June. FWS has been working with the Bureau of Land Management to remove traps for the summers due to increased summer recreational activities.

**Clark Watry (Cramer Inc):** On the Stanislaus, the first sample was collected on 1/23/08. Low flows and low escapement resulted in the catch of only ~20 fry by March. Flows jumped up to 1500 cfs and some more fish were captured. The total catch of the season was only 222 salmon, 188 of which were smolts. No efficiency trials were conducted until April when the Merced River hatchery had fish available for them to use. Merced rotary trapping began in early March, but no Chinook were caught until late April. No fry were seen, only smolts in low numbers. Seven efficiency trials were conducted throughout the season, although <60 naturally produced fish were captured during that period.

**Steve Pagliughi (EBMUD):** Rotary trapping on the Mokelumne occurred during a low flow year, with minor fluctuations, and decent water temperatures. One trap sampled below Woodbridge dam from January 8 to May 29. A second traps was placed approximately 15 miles upstream of the dam (new sampling location) and began sampling January 8<sup>th</sup> as well. Chinook were immediately captured at the upper site. The upstream RST was removed from the river on April 25 due to concerns associated with EBMUD's Section 10 steelhead take allowance. Capture and subsequent passage of

Chinook at the two sites differed greatly whereby ~13,000 and 38 fry were captured at the upper and lower sites, respectively. Overall, the upper trap sampled ~14,000 Chinook and the lower trap ~ 600. The corresponding passage estimate values were 1,117,451 and 18,347, respectively. Efficiency trials were conducted monthly as river conditions were relatively stable. Results of trials were 2.6% to 8.9% efficiency, with one outlier of 0.4% efficiency. Escapement of fall-run was estimated at 1,521 adults.

**Robyn Bilski (CDWR):** One rotary trap on the Feather River in low flow channel (RM 061) and two (tandem) in high flow channel (RM 038) since November. The low flow channel trap captured ~ 500K fall-run Chinook with a corresponding passage estimate of 4.6 million fish. Spring-run estimated passage was ~100,000 based on a catch of ~12,000. Late fall passage was not estimated with a catch of ~4,000 fish. Interestingly, the escapement of fall and spring Chinook was estimated to be a 50:50 ratio. In addition, a minimum of 7% of spawned out adult females recovered from the 2007 FR carcass survey were spring-run Chinook. These data suggest that spring-run passage should have been considerably higher, possibly calling into question the reliability of the length at date criteria used to determine juvenile fish run in this area. Plans call for a fall/spring run segregation weir to be installed in 6-7 years based on FERC relicensing information. Overall the trap exhibited an average efficiency rating of 15% for the season.

Two tandem traps were set up in the high flow channel and fall Chinook passage was estimated at 2.8 million based on a catch of 130,000 juveniles. Spring run passage was not estimated based on a catch of only 63 fish.

Additionally 200,000 naturally produced Chinook were coded-wire tagged and released at RM 60, with 1,000 recaptured at RM 46. CDWR currently is working on a bid for a fourth rotary trap.

**Kellie Whitton (USFWS):** Battle Creek was monitored with two rotary traps, one above the weir at Coleman National Fish Hatchery and one below (to catch juvenile Chinook for efficiency study only). Kellie noted a later outmigration of rainbow trout compared to other years. Nineteen paired efficiency trials were conducted using hatchery and naturally produced fish. Trap efficiency ratings for naturally produced fish were significantly higher with hatchery produced fish. Most trials were conducted at flow of  $\leq 500$  cfs and with little variability due to lack of runoff events.

Additional recent work included progress on a community study and lamprey study prior to the planned restoration work of Battle Creek. Kellie plans to investigate further a possible spatial separation/segregation of lamprey between the North and South Forks between Pacific and Western Brook lamprey.

**Bill Poytress (USFWS):** Red Bluff Diversion Dam (RBDD) rotary trapping is occurring with 3 traps currently due to RBDD operations. Passage since the January meeting consisted predominantly of fall-run fish. Estimated passage for the year is 10.5 to 11 million juveniles. Fall-run fish passage ceased sharply in March and has been low to date, relative to previous years. Catch of late-fall run and increased passage of steelhead

was also noted. Winter-run passage was estimated at 1.5 million fish, significantly less than recent prior years' values of 8 to 9 million juveniles. No larval green sturgeon captured this calendar year to date.

**V. Group Discussion Topic:** Review of Comments Received by Members of the JMPWT to the revised draft CAMP rotary-screw trap sampling protocol led by Doug Threlhoff (USFWS).

Doug began with background information on the Comprehensive Assessment and Monitoring Program (CAMP) stating the program began in 1997. Recently the CAMP program has undergone a peer review and it was noted that juvenile rotary-screw trapping (RST) data is a valuable tool to evaluate the effects of restoration activities within watersheds. In 1997, the CAMP developed a rotary screw trap protocol, and in late 2007 the CAMP developed a revised draft protocol. Members of the juvenile monitoring project work team (JMPWT) were asked to review the document.

Doug received ~185 comments on the revised draft protocol from the team. It was agreed that the meeting would review some of the key comments in an effort to develop consensus on some of the topics where multiple comments were provided. It was noted that the majority of the comments received focused on the data collection aspect of the protocol. Because the way data are collected constrain the future utility, analysis, and reporting of data, it was decided the meeting would focus on resolving issues related to the ways data are collected. As noted by Doug, data collection is key as you can't go back and collect more data after the fact. Analysis can be done in different ways even after the initial reports are produced.

***Issue #1: Life Stage Assessment: Should the entities that collect rotary screw trap data in the Central Valley use a standardized number of life stages when classifying juvenile Chinook salmon? Should entities use qualitative morphological features to classify fish according to life stage, or should quantitative features, e.g., fish length, be used?***

Some entities classify fish using two life stages (e.g., fry and presmolt/smolts), while other entities classify fish using as many as eight life stages. Different entities also use different methods, i.e., quantitative vs. qualitative, to determine life stage.

**B. Poytress** asked the group if it would be possible to analyze existing data (e.g., Battle/Clear Creek or Stanislaus RST data) taken on life stage with respect to fork lengths measured to determine if a quantitative assessment (e.g., fork length) could be made as opposed to the qualitative assessment requested in the protocol. **C. Watry** noted that although life stage assessments are subjective at times, it is typically analyzed at the office more thoroughly to make better overall assessments. **J. Earley** noted that in Clear Creek it is difficult to discern whether larger fish captured are true smolts. In areas such as Mill and Deer Creek it is more apparent. **K. Whitton** and **D. Colby** noted that silvery parr /parr and fry / parr , respectively, are often times difficult to distinguish in the field.

**S. Pagliughi** posed the question, what does silvery parr give us. Fry, parr, and smolt, indicate emergence, rearing, and outmigration, respectively. **D. Colby** noted there may be some differences in condition factor relative to the silvery parr stage or others. **C. Watry** noted that life stage and length are good data to collect.

**Conclusion:** *The CAMP protocol will recommend that, at a minimum, entities classify fish using a minimum of four life stages, i.e., fry, parr, smolt, and yearling, and that entities can continue to use additional life stage notations (e.g., silvery parr), if desired.*

**Issue #2: Collection of Fish Weight Data: Should fish be weighed?**

At the prior JMPWT CAMP protocol discussion meeting, **J.D. Wikert** highlighted the benefit in quantifying the weights of a representative number of fish so Fulton's K factor could be calculated and inferences of habitat quality could be made.

**D. Threloff** asked the group if there is value in using Fulton's K factor data. What exactly is it? The group noted that K factor data is of limited value and lipid content is probably a better metric for assessing fish condition. The group expressed concerns of increased fish handling, especially when dealing with Endangered or Threatened Chinook or Steelhead. **R. Bilski** noted it would require a controlled environment to accurately weigh fish thereby resulting in relocation of fish. Additionally, most fish encountered on the Feather are fry weighing ~ 1.0 g and is this of much value?

**Conclusion:** *Fish weight data and Fulton's K of limited value. If there is a need to collect fish weigh data during a particular project, fish can be weighed with sub-sampling routines after minimum sample sizes have been determined and there are protocols to minimize stress during the weighing operation. The CAMP protocol will not recommend that fish weight be monitored as a standard practice, unless there is a specific need to do so.*

**Issue #3: Trap Efficiency Trials Using Mark-recapture Techniques: Should there be a standardized distance upstream of a rotary screw trap site where marked fish are released during trap efficiency tests?**

The distance that efficiency test fish are released upstream of a rotary screw trap varies according to watershed.

The discussion was started by asking the group what their project's marked fish release distances from the traps were. The release distances ranged from 200 m to 4 km. Multiple factors were noted for release locations including having a 'pool, riffle, pool, riffle' structure. An area above the trap where a channel constriction occurs to meet the assumption of equal mixing of marked and unmarked fish and ideally releasing fish completely across the stream transect to evenly distribute marked fish. It was noted that consistent results derived during same or similar conditions allows for a comfort level with the results achieved. **S. Pagliughi** noted that a standardized release site will allow for natural effects such as predation or other in-stream conditions.

***Conclusion: Making best attempts to meet assumptions of mark-recapture experiments is important. Predation is a concern, but occurs with wild fish as well. The evaluation of release sites should be conducted until repeatable results achieved under the same conditions.***

## **Lunch Break**

***Issue #4: Defining the Time Period to Conduct Sampling: When should rotary screw trapping take place to monitor the abundance of juvenile fish numbers across the entire outmigration period?***

The CAMP rotary screw trap protocol currently recommends that rotary screw traps be operated during the following dates: fall-run Chinook salmon sampling should occur from January 1 through June 30; in streams with fall- and spring-run Chinook salmon, monitoring should occur from September 1 through June 30. A question was raised as to whether these dates reflected the entire season when outmigration may occur.

**E. Chappell** noted that it should be expanded to begin December 1 and end July 15 as sometime spring outflow (e.g., San Joaquin in May and June 25,000 cfs in 2005) can be significant. **C. Watry** noted that criteria, such as temperature, should be added to determine sample end date. **J. Earley** stated, in relation to fall and spring Chinook spawning timing, that spring Chinook are not spawning in Clear Creek in August in contrast to the literature on spring Chinook spawning timing. Therefore, his group uses temperature units to determine emergence timing based on snorkel surveys of adult spawning activity. Trap deployment is scheduled to occur at or immediately prior to emergence timing, which in recent years has been about mid-November. **S. Pagliughi** uses an egg model on the Mokelumne to determine deployment date. Typically, it falls in mid-December to early January. He advises December 1<sup>st</sup> to be conservative and to ensure the capture of initial outmigrants.

***Conclusion: As a general guideline, the sampling periods for fall and spring run Chinook salmon should occur between December 1 and July 15<sup>th</sup>, and X and Y, respectively. Entities may elect to use emergence modeling and maximum temperature threshold criteria to refine the dates when trapping should take place in a given year.***

***Issue #5: Live Box Retention Tests: Should they be performed regularly?***

**D. Threlhoff** asked if live box retention tests should be performed to quantify the loss of juvenile salmon that may occur due to: a) predation or b) loss of fish as they escape the live box after they are initially captured. If these losses are substantial, the estimated abundance of captured fish may be underestimated.

**B. Poytress** noted there are two distinct issues with regard to this subject. The first being structural integrity of sampling equipment and the second predation. Many indicated that the structural integrity of traps needs to be checked daily to ensure sampling equipment is

working properly. Predation effects can be minimized by adding fry refugia during times of predator entrainment or multiple size class interactions. **E. Chappell** noted that performing mark and recapture experiments within liveboxes may add to complicated take permits processes and could be an issue with respect to handling and marking of Endangered or Threatened species.

***Conclusion: Live box retention tests should be employed if chronic, significant losses of fish are suspected to occur from within a rotary screw trap live box. The tests are not recommended if substantial problems are not suspected to exist.***

***Issue #6: Monitoring the production of O. Mykiss: Should the CAMP protocol recommend that the production of steelhead be monitored?***

The CAMP rotary screw trap protocol does not suggest that the production of the abundance of steelhead be quantified. Because steelhead are captured with rotary screw traps as Chinook salmon are monitored, should there be an effort to quantify the production of steelhead using rotary screw trap data?

***Conclusion: Based on brief discussion, estimating the production of steelhead would require an understanding of trap efficiency rates for this species. At present, there is little data on rotary trap efficiency with respect to steelhead. Chinook salmon efficiency data are believed to be of little use for O. Mykiss passage because steelhead are more difficult to capture. The CAMP protocol should not suggest that rotary screw traps be used to quantify the production of steelhead.***

***Issue #7: Setting minimum standards for assessing trap efficiency: Should the entities that conduct rotary screw trap efficiency tests strive to achieve minimum trap efficiency estimates of 2-3%?***

The precision of juvenile salmon production estimates that are derived from rotary screw traps improves as trap efficiency estimates increase. Rotary screw trap efficiency varies widely across the Central Valley; some entities experience trap efficiencies of <1%, while other entities have trap efficiencies of 20+%. The draft CAMP protocol arbitrarily recommends that entities strive to achieve a trap efficiency of at least 2-3%.

***Conclusion: Based on brief discussion, achieving a fixed trap efficiency standard may not be feasible in some areas (e.g., large river systems).***

## **VI. Conclusion and Next Meeting Date and Topic.**

The next meeting is tentatively scheduled for September 17, 2008 at the Yolo Bypass Wildlife Area. The topic will be developed in the coming months. Feel free to contact the chair to provide input.